

What is claimed is:

1. A scrap submergence device comprising:

a body comprised of a refractory material that defines a submergence chamber, the body including at least one passage; and

a rod in the passage, wherein the rod is placed under tension to impart a compressive load on the body.

2. The device of claim 1, further comprising a biasing member disposed at one end of the rod for applying a compressive force on the body.

3. The device of claim 2, further comprising a retaining element at an end of the rod opposite the biasing member.

4. The device of claim 1, wherein the body includes a vertically upward sloped inlet passage for allowing material to enter the submergence chamber.

5. The device of claim 4, wherein the inlet passage is at least substantially tangential to an inner surface of the submergence chamber.

6. The device of claim 5, wherein the body defines an outlet opening at substantially a same height within the submergence chamber as an inlet opening.

7. The device of claim 1 further comprising a side wall element and a base element interconnected via the rod.

8. The device of claim 1, further comprising a frame at least partially surrounding at least to an upper portion of the body.

9. The device of claim 1, further comprises a plurality of rods within passages in said body.

10. A metal scrap submergence device comprising:

a body comprising a side wall and a base, the side wall including an at least substantially vertically oriented passage, and the base including an at least substantially vertically oriented passage aligned with the passage in the side wall;  
a rod received in both of the passages;  
an inlet passage disposed in at least one of the side wall and the base for allowing molten material to enter the scrap submergence device; and  
an outlet passage disposed in the base for allowing molten material to exit the scrap submergence device.

11. The device of claim 10, wherein the side wall is removably mounted to the base.

12. The device of claim 11, wherein the one of the side wall and the base includes a notch and the other includes a cooperating protrusion received in the notch when the side wall and the base are joined.

13. The device of claim 10, further comprising means for controlling vortex flow of molten metal inside the submergence device.

14. The device of claim 10, further comprising an outlet extension tube connected to the body and in communication with the outlet passage.

15. The device of claim 10, further comprising a riser tube extending upwardly from the base and in communication with the outlet passage.

16. The device of claim 10, wherein the body defines a gas injection inlet in communication with the submergence device and an associated gas source.

17. The device of claim 10, further comprising a frame connected to the side wall, the frame being adapted to limit thermal expansion or thermal contraction of the side wall.

18. A method for extending the life of a material submergence device comprised of a refractory material and shaped to generate a metal vortex flow,

the method comprising confining the material submergence device with a structure made from a material that has a greater tensile strength than the refractory material.

19. The method of claim 18, wherein the structure comprises a rod under tension.

20. The method of claim 18, wherein the structure comprises a frame.

21. A furnace comprising:  
a submergence device well;  
a pump well in communication with the submergence device well;  
a dross well in communication with the submergence device well;  
a removable submergence device disposed in the submergence device well.